COMMIT

Chemical, Optical, and Microphysical Measurements of In-situ Troposphere

The COMMIT mobile laboratory was established in 2006.

Key COMMIT Facts

- Nominal field configuration: comprehensive and rack-mounted *in-situ* instruments (Figs. A&B) for aerosol and trace gas measurements, serving as a supersite in "*Ground-based Formation Flight*" operations.
- COMMIT URL: *https://smartlabs.gsfc.nasa.gov/*

Description

COMMIT is equipped with four inlet stacks to ingest sample air from ~6-10 meters above the ground and to split it into groups of instruments: five trace gas analyzers for carbon monoxide/dioxide, nitrogen monoxide/dioxide, sulfur dioxide and ozone concentrations, and aerosol optical (light scattering, absorption and extinction) and microphysical (mass concentration and size distribution at different size cuts) properties. Also, two identical sets of Nephelometers and Scanning Mobility Particle Sizers are used to probe aerosol hygroscopicity between ambient and adjustable relative humidities.

Data Products

- Aerosol mass concentration and size distribution
- Aerosol light extinction/scattering/absorption coefficient
- Aerosol hygroscopicity and activation
- Trace gas concentration

Parameters

- Gas concentration: NO_x/NO_y, SO_2, CO, CO_2, and O_3
- Mass concentration of $PM_{10\mu m}$, $PM_{2.5\mu m}$ and $PM_{1\mu m}$
- Aerosol size distribution: 5 nm ~ 20 μm in diameter
- Extinction/scattering/absorption coefficient: at nominal wavelengths of 0.45 (blue), 0.55 (green), 0.65 (red) μm, with additional absorption at 0.37, 0.59, 0.88, 0.95 μm

Science questions to be addressed

- How are the chemical and microphysical properties of aerosol particles linked to their optical properties?
- How are the aerosol properties near the surface related to those in the boundary layer and aloft?
- Can we better quantify the aerosol indirect effect?

Principal Investigator

Si-Chee Tsay (*si-chee.tsay@nasa.gov*)
NASA Goddard Space Flight Center, Greenbelt, MD

Team Members

Ukkyo Jeong (*ukkyo.jeong@nasa.gov*)
University of Maryland, College Park, MD

Adrian M. Loftus (*adrian.m.loftus@nasa.gov*)
University of Maryland, College Park, MD

Peter Pantina (*peter.pantina@nasa.gov*)
Science Systems and Applications, Inc., Lanham, MD

Key References

- Tsay, et al., *AAQR*, 2016, doi:10.4209/aaqr.2016.08.0350
- Pantina, Tsay, et al., *AAQR*, 2016, doi:10.4209/aaqr.2015.011.0630